Common Reactions of Acids

1. acid + metal \rightarrow salt + hydrogen gas

2. acid + base (metal hydroxide) → salt + water
3. acid + metal oxide → salt + water
4. acid + metal carbonate → salt + carbon dioxide gas + water
5. acid + metal hydrogen carbonate → salt + carbon dioxide gas + water
6. acidic oxide (non-metal oxide) + base (metal hydroxide) → salt + water
Exercises:
Write both full and ionic equations for the following reactions:
a) Magnesium(s) and sulfuric acid
Chemical equation:
Ionic equation:
b) Aluminium(s) and nitric acid
Chemical equation:
Ionic equation:
c) Sulphuric acid and solid sodium oxide
Chemical equation:

d) Copper(II)carbonate(s) and nitric acid	
Chemical equation:	
Ionic equation:	
e) Potassium hydrogen carbonate(aq) and sulfuric acid	
Chemical equation:	
Ionic equation:	
f) Solid sodium oxide and phosphoric acid	
Chemical equation:	
Ionic equation:	
g) Solid copper(II) oxide and hydrochloric acid	
Chemical equation:	
Ionic equation:	
h) Potassium hydroxide and sulfuric acid	
Chemical equation:	
Ionic equation:	
i) Magnesium hydroxide(aq) + phosphoric acid	
Chemical equation:	
Ionic equation:	
j) Nitric acid + solid magnesium oxide	
Chemical equation:	
Ionic equation:	

Exercises:

Write both full and ionic equations for the following reactions:

a) Magnesium(s) and sulfuric acid

Chemical equation: $Mg(s) + H_2SO_4(aq) \rightarrow MgSO_4(aq) + H_2(g)$

Ionic equation: Mg(s) + 2H+ (aq) \rightarrow Mg²⁺ (aq) + H₂(g)

b) Aluminium(s) and nitric acid

Chemical equation: 2 Al(s) + 6 HNO₃ (aq) \rightarrow 2 Al(NO₃)₃ (aq) + 3 H₂ (g)

Ionic equation: $2AI(s) + 6H + (aq) \rightarrow 2AI^{3+}(aq) + 3H_2(g)$

c) Sulphuric acid and solid sodium oxide

Chemical equation: H_2SO_4 (aq) + Na_2O (s) $\rightarrow Na_2SO_4$ (aq) + H_2O (I)

Ionic equation: $2H^+$ (aq) + Na₂O (s) \rightarrow 2Na+ (aq) + H₂O (l)

d) Copper(II)carbonate(s) and nitric acid

Chemical equation: $CuCO_3$ (s) + 2HNO₃ (aq) \rightarrow $Cu(NO_3)_2$ (aq) + H₂O (l) + CO₂ (g)

Ionic equation: $CuCO_3$ (s) + 2H+ (aq) $\rightarrow Cu^{2+}$ (aq) + H₂O (I) + CO₂ (g)

e) Potassium hydrogen carbonate(aq) and sulfuric acid

Chemical equation: 2 KHCO₃ (aq) + H_2SO_4 (aq) \rightarrow K_2SO_4 (aq) + 2 H_2O (I) + 2 CO_2 (g)

Ionic equation: HCO_3^{2-} (aq) + H^+ (aq) $\rightarrow H_2O$ (I) + CO_2 (g)

f) Solid sodium oxide and phosphoric acid

Chemical equation: $3Na_2O(s) + 2H_3PO_4$ (aq) $\rightarrow 2Na_3PO_4$ (aq) $+ 3H_2O$ (I)

Ionic equation: $3Na_2O(s) + 6H^+(aq) \rightarrow 6Na+(aq) + 3H_2O(l)$

g) Solid copper(II) oxide and hydrochloric acid

Chemical equation: CuO (s) + 2 HCl (aq) \rightarrow CuCl₂ (aq) + H₂O (l)

Ionic equation: CuO (s) + 2 H+ (aq) \rightarrow Cu²⁺ (aq) + H₂O (l)

h) Potassium hydroxide and sulfuric acid

Chemical equation: 2 KOH (aq) +
$$H_2SO_4$$
 (aq) \rightarrow K_2SO_4 (aq) + 2 H_2O (I)

Ionic equation: H+ (aq) + OH- (aq) \rightarrow H₂O (I)

i) Magnesium hydroxide(aq) + phosphoric acid

Chemical equation: $3 \text{ Mg(OH)}_2 \text{ (aq)} + 2 \text{ H}_3 \text{PO}_4 \text{ (aq)} \rightarrow \text{Mg}_3 \text{(PO}_4)_2 \text{ (aq)} + 6 \text{ H}_2 \text{O (I)}$

Ionic equation: H+ (aq) + OH- (aq) \rightarrow H₂O (I)

j) Nitric acid + solid magnesium oxide

Chemical equation: 2 HNO₃ (aq) + MgO (s) \rightarrow Mg(NO₃)₂ (aq) + H₂O(I)

Ionic equation: 2 H+ (aq) + MgO (s) \rightarrow Mg²⁺ (aq) + H₂O(I)